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ABSTRACT

Project CAPABLE (Classroom Action Program: Aim: Basic Learning Efficiency) is a classroom approach which integrates the basic learning skills with content. The goal of the project is to use basic learning skills to enhance the learning of content and at the same time use the content to teach basic learning skills. These monthly reports explain how the basic learning skills can be taught in physical science classes. One learning skill is covered by each monthly report. They include: Learning Skills; Comprehension Development; Vocabulary Development; Directed Reading Activity (DRA) and SQ3R (Survey, Question, Read, Recite, Review); Study Skills; Management Techniques; Structured Overviews and Study Guides; and Interest, Motivation, Assessment. (BS)

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Project CAPABLE

CLASSROOM ACTION PROGRAM:

AIM: BASIC LEARNING EFFICIENCY

"to make each student a more capable learner"

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AUGUST REPORT

LEARNING SKILLS

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TITLE IV: PART C
DEVELOPMENTAL GRANT

SCIENCE

Claire Labrie

While synthesizing the research findings concerning skills needed in each content area, a content area teacher's role became very apparent. Content area teachers have to teach their students the skills necessary for a successful comprehension of content materials.

The skills needed for the reading of science materials are essential like those needed to read other content area materials except that the reader has to adapt them to the nature of scientific writing. The teacher's role is to teach these skills in their context so that they can be recognized and learned.

The Science reading skills that I have found to be necessary in order for scientific materials to be comprehended are:

1. Skill in varying the rate of reading according to the purpose for the reading and the nature of the materials by first surveying the reading materials.

2. Skill in using parts of the book

    a. title page
    b. table of contents
    c. index (subject - author)
    d. glossary

3. Skill to locate, comprehend and combine information from a variety of library resources.

4. Skill in using the vocabulary of science which includes technical and nontechnical words and symbols.

5. Skill in understanding and using formulas.

6. Skill in gaining accurate information from graphic aids such as charts, diagrams, and graphs.

7. Skill in reading for exact meaning - noting main ideas, supporting details, and also seeing organization.

8. Skill in reading directions accurately.

9. Skill in evaluating science materials, in drawing conclusions, making judgements, and discerning evidence by sorting facts from opinions.

10. Skill in applying data from reading to practical problems.

11. Skill in skimming and scanning scientific materials.

There are other necessary skills that one has to possess before being able to use tne above mentioned skills. These prereading skills that are needed to read science materials are:

1. A very good background of experience that one brings to his reading.

2. Skill in using an effective study - reading technique. Ex. SQ3R.

3. Skill in recognizing words by use of context, phonetic, and structural dues.

4. Skill in dictionary usage.

5. Skill in recognizing different organizational patterns - different patterns of writing.

Science

1. Enumeration: detailed statement of facts
2. Classification:
3. Generalization: explanation of a technical process
4. Problem solution: descriptive problem solving
5. Comparison or contrast
6. Sequence: instructions for an experiment

6. Skill needed before all of these can become effective is the need for a positive attitude about reading science materials.

Classroom Skills

An isolated list of skills needed in a science classroom would be as such:

1. Notetaking skills
2. Listening skills
3. Following written and oral directions
4. Ability to comprehend an oral presentation of materials at the various level of comprehension.

1. Literal level

2. Interpretive level

3. Utilization level

5. Skill in analizing Greek and Latin roots.

6. Developing skills of self-questioning at the literal, interpretive and utilization levels.

7. Skills in concentration and effective test-taking strategies.

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SEPTEMBER REPORT

COMPREHENSION DEVELOPMENT

TITLE IV: PART C
DEVELOPMENTAL GRANT

SCIENCE

Claire Labrie

One major concern teachers should have is finding out the levels of comprehension that can successfully be used by each student. This can be done by employing some type of informal assessment.

Michael O'Donnell describes comprehension as a process of thinking where questioning is possibly the most important tool for helping students comprehend and interpret what they read. He classifies questions on three levels:

1. Literal: The reader merely recalls what the author has said. This does not deem understanding. "Types of questions at this level include:

   Who _____?

   When _____?

   How _____?

   Where _____?

   What _____?

   Define _____?

   Explain _____?

   The literal level represents the least abstract base of thinking."[1]

2. Interpretive: Involves a search for relationship within the material. Reader needs to apply what an author has said in order to derive meaning from his statement. Examples of interpretive types of questions would be

   a. Comparison and contrast between two sets of data.

   b. Implication where student must supply strong evidence to support a conclusion or generalization.

   c. Cause-effect requires an understanding and recognition of the events that lead to the situation.

   d. Quantitative need several facts in order to reach a conclusion.

3. Utilization: "It moves from the interpretive level (pulling relationships together in the selection) and applies those data to new situations or problem."[1] "Herber defines this process as taking the product of the literal (what the author has said), and the interpretive (what he meant by what he said), and applying it to some pragmatic or theoretical exercise, using knowledge the reader already possesses."[2]

Examples of questions asked at the utilization level of comprehension may be -

a. application: where students use inferences and concrete situations in some new and different content.

b. analysis: students here are required to do abstract thinking which can successfully be accomplished at upper grade levels.

c. synthesis: students have to put several ideas together to form a new concept.

d. evaluation: students are required to make a judgement about the value of certain ideas, proposed solutions or methods according to established criteria and standards.

It is important to realize that each level requires the product of the previous level or levels in order to function properly. The literal level of comprehesion is the only one that can stand alone.

Reading is comprehension which involves the interaction of the reader and the writer. It is a complex network of interrelated skills, and as stated above, it also involves several levels of thinking. Reading is part of a holistic act, rather than a molecular response to the text. Comprehension involves a complex list of abilities. Before one states the requirements a reader needs before comprehension takes place, stress should be placed on the

fact that someone knew about the topic prior to reading and what he or she ends up possessing following the reading. "Factors which influences the ideas gained during the reading of materials are (1) nature of the learner, (2) nature of the materials, (3) nature of the purposes for reading and (4) means used for measurement."[3]

A list of various comprehension requirements needed in the science content area would be as follows:

a. ability to associate experiences and meaning with the graphic symbol.
b. ability to react to sensory images.
c. ability to interpret verbal connotations and denotations.
d. ability to understand word in context and to selecting meaning that fit the context.
e. ability to detect and understand main idea.
f. ability to recognize significant details.
g. ability to interpret the organizational writing patterns such as descriptions, narration, expostion and argumentation or persuasion.
h. ability to answer questions asked in a printed passage.
i. ability to follow directions
j. ability to preceive relationships; part-whole, cause-effect, general-specific, sequence, size and time.
k. ability to make inferences and draw conclusions, to implied details, and to evaluate what is read.
l. ability to recognize and understand author's purpose.
m. ability to determine whether the text affirms, denies, or fails to express an opinion about a supposed fact or condition.
n. ability to retain ideas.

o. ability to apply ideas and to integrate them to one's past experiences.

p. knowledge of connections used in science text books, such as but, if, since, for example, however, etc.

Bloom's taxonomy is concerned with the levels of learning task. O'Donnell uses Bloom's taxonomy and labels the knowledge component as getting the literal meaning from the readings. Comprehension would fall under O'Donnell's interpretive level. The utilization level of comprehension would involve application analysis, synthesis, and evaluation. In order for science students to achive the third level of comprehension, they would need to possess the ability to understand reading as a source of pleasure and personal fulfillment besides some of the abilities mentioned earlier. The thirst for information needs to be present before it can be satisfied.

It is not enough for teachers to realize that we should be teaching our students how to think. Teachers have to provide practice to develop thinking skills higher than those needed to get the literal meaning out of a text. Our best medium available to achieve this purpose is through the communication media. When it is realized that reading content is one of the richest communication media available, research might become more available. "There seems to be a lack of research on how to develop thinking skills in connection with reading content."[4] Nila Benton Smith also feels a need for improved techniques in stimulationing in-depth reading. This can be achieved by the use of questions; questions posed to the students by the teacher which requires students to go beyond direct implications gathered from text.

Knowing that there is a decline in the growth of many children's reading comprehension skills in intermediate grades, it may be fruitful to see how this could be altered. Research seems to point us into the area of questioning. Plaget's scheme of growth of intelligence for children between ages 9-12 shows

that they are capable of thinking at higher levels of comprehension. The schools new need to provide motivation and appropriate teaching styles. Questions which are well written can have students imply ideas, draw conclusions from stated and implied information and cause evaluation of content in terms of author biases and purpose. Plaget also views cognitive development occuring as the learner interacts with his environment and experiences encounters in that environment. Questions are important in the organization of experiences in the learning process. Research data shows a direct relationship between the process involved in answering a comprehension question and the cognitive processes used to achieve the response. Factual questions are answered by using lower cognitive levels type of processes while the use of higher cognitive levels processes would answer questions geared at the interpretive and utilization level. Seventy percent (70%) of questions asked by teachers are at the literal comprehension level (Guszak). This may be due to the fact that teachers encounter more of these level questions in their instructional materials. Knowing this, teachers can improve the quality of their questions asked. Strategies useful for this purpose are:

1. Questions should be evaluated before they become part of instructional guides.
2. Should be in question form rather than suggestion and anticipated answers should be included.
3. Questions are sequenced at various levels providing for the progression of learning from lower to higher cognitive levels.
4. Should first begin with a focusing questions which focuses up topic to be discussed which are then followed by extending questions once topic has been persued.
5. Raising questions are then asked which requires information gotten from higher cognitive level of learning. It is at this point that the

learner associate past knowledge with that which is called for.

Comprehension can be improved in all content areas through the use of well designed questions and questioning strategies. Appropriate questions can develop meaning of new words by using contextual clues. Science questions will be concerned with details, exactness, and with cause and effect relations. Questioning in all content area can be developed from the use of various medias, such as film, filmstrips, recording, T.V. and radios, etc, which supplement the textbook. The teacher's role of being a giver of information, will be altered to that of a guide in a discovery type of approach to learning by the use of higher level cognitive questions and questioning strategies.

The problem of improving comprehension through the use of questioning strategies involves three interrelated factors: (1) pupil himself, (2) item he reads, and (3) kind of reading instruction which he receives. The students will need some fundamental skills which are basic to his effective comprehension. These skills are word recognition, meaning vocabulary and a depostion to seek additional information if needed.

A higher level comprehension involves thinking activities that are more complex than those required in passive reading; however, higher level of comprehension is dependent more upon the kind of instructional assistance that is given to the student rather than on the student's intellectual ability. It then is important for a teacher to guide the student's reading till students can become independent in doing so. The use of homework assignments can gear student's thinking requiring answers to higher level of cognitive type questions. Class discussion can be applied to serve this same type of purpose. Rules to follow when questions are asked to stimulate discussion would be: (1) phrase questions carefully, (2) don't answer your own questions, (3) allow enough time for students to think before they react, (4) don't allow any ridiculing of wrong answers and (5) encourage open debate with students which leads them to ask

questions from each other.

It was mentioned above that students should be geared to become independent in guiding their reading. This can be achieved through direct training. Teachers should follow this format when giving assignments. First, troublesome vocabulary words are talked about, and 2nd concepts are briefly explained and then students have to set a purpose to read. At first this is accomplished by the teacher posing questions geared at various comprehension levels. The pace is set with enthusiasm and eagerness. The teacher's skills of asking questions should be passed onto the student. It will be at this point of occurence that students become independent pace setters. Directed training with provided practice time is first needed as students with teacher's guidance write up their own pre-reading questions. Research shows that pre-reading questions should be asked at various levels if all levels of comprehension are acted upon when reading occurs. Teachers can use their questions as a model for students to follow, so the responsibility of exposing students to the utilization level of comprehension lies on the teacher. Questions have to be written to fit the purpose and task. A successful technique that does exactly what has been explained is an effective study-reading technique. There are a number of them on the market, therefore, a teacher would have to decide which is the best one for her students and she would have to consider the content area and the capability of her students.

Other classroom applications that teachers can use to improve comprehension skills of their students are numerous. The way an assignment is given is important. Time and thought should go into the giving of the assignments so that student's reading abilities are turned on. Assignments should contain several components such as: (1) captive interest, (2) relate the material to be read to student's past experiences, (3) setting purposes for reading either teacher directed or student directed, (4) letting students know how reading should be done to accomplish purpose, (5) pre-teach vocabulary words and concepts that

would otherwise block their understanding, and (6) provide reading materials suitable at a variety of readability levels if possible. Meaningful reading implies an understanding and interpretation of the English language. Vocabulary training and knowledge of language patterns also have to be considered during the reading assignments. A last and foremost component of a successful assignment are post reading questions. These serve to generate and maintain discussion, besides allowing students to evaluate their own comprehension as teachers provide feedback. This also provides teachers with diagnostic information about student's comprehension skills while providing students practice with particular thinking skills. Here also questions are geared at all levels of comprehension. Considering all of the knowledge available on improving comprehension skills for students, a new and brighter future is laid out for them in the world of reading.

In using my textbook, "Holt Physical Science", I have found that many of the questions asked in back of the chapters are questions dealing mostly with the literal and interpretive level of comprehension.

For example, Chapter one title "Motion", had 27 questions asked. A break down of these questions is as follows:

8 Literal type questions which could be answered directly from the textbook.

13 Interpretive type questions - students required to infer meaning

3 Interpretive type questions - students were required to do some math computations

1 Interpretive type question - students required to compare and contrast two different concepts.

1 Utilization type question where students were required to apply concepts and ideas to a new situation.

I felt a few more questions could have been asked at the utilization level of comprehension. Here is an example of a question that I would have used.

1. As a student you are asked to present a lecture to a dieting group. You want to be humorous so you make a joke about the size of mass and weight on earth compared to that on the moon. What would your joke be?

Chapter 8, title "Matter" had 20 questions. The breakdown is as follows:

11 Literal level type question

4 Interpretive level type questions where students compared & contrasted two concepts.

5 Interpretive level type questions which required students to use inductive reasoning

No utilization level questions were asked in this chapter. Questions which I have constructed at this level are:

1. Knowing the differences between chemical and physical changes, explain the processes of changes involved in using a cake mix and baking the cake. Include in the explanation the types of changes which also occur when one eats the cake.
2. You are asked to invent a new mixture that is not found on the market. In front of you are a beaker of water, dishes, salt, pepper, sand and rocks. What mixture would you invent that you feel would have good selling qualities?

Chapter 12, title, "Chemical Changes" had 30 questions asked at the end. A break up of these questions is:

19 Literal type questions

10 Interpretive type questions. Students were asked to infer meaning in order to answer questions correctly.

1 Utilization type question where students were required to apply knowledge to a new situation

There was an unbalanced of the types of questions used. More utiliation questions could have been included. An example is as follows.

1. When reading about polluted water, discuss some ways that you can educate your family about water pollution which would result in getting cleaner water.

FOOTNOTES

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OCTOBER REPORT

VOCABULARY DEVELOPMENT

TITLE IV: PART C
DEVELOPMENTAL GRANT

SCIENCE

Claire Labrie

The teaching of reading and the teaching of content, such as science, have one thing in common - vocabulary development. In a content area classroom, vocabulary development deals not only with indepth meaning of words but also with the versatilities of words. As a result of the research for this paper, it became apparent that the context area teacher has a responsibility of helping students enlarge their vocabulary.

Students possess four types of vocabulary that can be grouped into two categories:

Passive Vocabulary: reading vocabulary - listening vocabulary.

This consists of less familiar words which a student would recognize and understand the meaning of while reading or listening.

Active Vocabulary: speaking vocabulary - writing vocabulary.

This consists of words the student recognizes and uses when speaking. In high school, student's passive vocabulary is usually three or four times larger than their active vocabulary.

Our role, as content area teacher, then is to provide direct and indirect experiences so that students can increase their vocabulary power.

A good vocabulary program will foster self-motivation, self-guidance, and self-direction. Such programs stress the importance of first providing the students with either direct or indirect experiences with the concepts being developed. Other components of a vocabulary program provide direct attention to vocabulary through planned instruction - such as pre-teaching "wordstoppers," - words which are less frequently used. Wide reading is about the best way to mastering the meanings of commonly used words and expressions. These vocabulary programs are developed to employ a student's best learning modality. The three modalities used to teach vocabulary words are visual, auditory and kinesthetic. In high school, vocabulary words are frequently developed by using the first two approaches, where as the kinesthetic laboratory type situation. The realm of this

paper deals with methods employed by teachers and students in developing a vocabulary that will continue to increase throughout life.

There are many reasons why high school students possess poor vocabularies. Some reasons may be that students:

1) Associate only with people who have very poor vocabulary,

2) Have poor experiential backgrounds,

3) Lack voluntary readings,

4) Possess faulty reading habits,

5) Lack experiences which make it impossible to appreciate connotations of words,

6) Fail to accept or use proper meanings of words, and

7) Have low intellectual abilities.

Some of these reasons can be altered. Providing students with direct experiences with a new concept can prove valuable in learning new words, especially in cases where the lack of these experiences would make it impossible to fully understand the concept. Another aspect worth mentioning is the teacher's attitude towards vocabulary development. When the teacher's vocabulary is superior to the student's vocabulary and the teacher's attitude is very positive where time is spent enforcing vocabulary, students receive a positive image of the need for vocabulary growth.

It is very essential that students grasp the meaning of words if learning is to take place. Listed below are several steps a learner must take to develop word meanings.

1. Concepts are possible to understand only when students have had either direct or vicarious experiences with actual event that are to be conceptualized. The words are not the concept - they are just mere representations of the concepts.

2. As the concepts are being formed, discrimination is required to weed out nonessential characteristics. The meaning of the words have to be fully understood before the words can provide a label of the concepts.

3. The end result of abstraction is the full understanding of the concepts.

4. Students must now learn to categorize each experiences into proper classes of concepts.

"The effective development of vocabulary is directly related to the ability to conceptualize."[1] If meanings of words are to be understood, students have to discriminate, generalize, and use appropriate symbolization. Concepts are not opened and closed cases; they continue to develop as students gather more information and experiences. As teachers, we do not develop a concept totally in one lesson. We merely establish the basic meanings which enables our students to further discriminate and generalize. They do this through direct activities and from information gathered through listening and reading (indirect activities).

Certain types of vocabularies are pertinent to content areas. Vocabularies of various content areas arranges itself into three groups.

(1) General vocabulary: consists of words which may have application in general communication and may apply to more than one field.

(2) Nonespecific and general type: has a precise meaning in a given field of study depending on context it is in.

(3) Technical terms of a content field: This points out that words may have different connotations and denotations and students have to understand the correct meaning of the word if its meaning is to be comprehended.

There are several methods of vocabulary study. Teachers should use a variety of procedures to enhance student's vocabularies. Methods such as memorization of word lists, wide reading, study of word histories, use of context clues, use of phonetic and structural analysis, and the use of the dictionary are some of the few that have been utilized to develop vocabularies. There, however, is not one of these that can adequately develop students' vocabularies when used alone. The strategy that is selected in teaching certain vocabulary words depends on the students' needs and interests. The learning factors, such as concept utility, application, and memory load have also to be considered. The method that is

selected at the end to introduce new words should teach word processing skills. As these skills are being taught, the following factors should be considered:

1. the initial examples used should be easy and obvious.
2. very little emphasis is placed on the identification and labeling of the technique used,
3. skills should be presented within the content lessons,
4. exercise formats for each skill should be varied in order to achieve optimum learning,
5. careful monitoring of students learning pace is needed in order to insure maximum progress, and
6. newly acquired skills should be integrated with existing skills to promote growth in overall reading process.

The word processing skills researched for this paper are phonetic analysis, structural analysis, contextual clues and dictionary usage. Mentioned here will be what these strategies are and when they should be utilized.

In using the phonetic approach, students are taught to associate sounds into words. It is known that 85% of our English words are phonetic and therefore can be analyzed in accordance with specific principles. Since high school students have a familiarity with their language, with the teacher's help, they can learn new words by pronouncing them correctly. This method helps students to decode the words, it may not necessarily mean that the meanings of the words will be comprehended. The comprehension of the meaning of words would occur after the words have been decoded only if the word is part of a students' listening or speaking vocabulary.

When students use phonetic principles to pronounce a word, a concept of word meaning should already be in their experiential backgrounds. Whenever these principles are used, students should realize some basic conclusions. Certain phonetic principles which would help high school students when this approach is used are:

1. knowledge of close and open syllables,
2. knowledge of UCE pattern,

3. knowledge of the r-controlled vowels,
4. knowledge of consonant diagraphs and consonant blends,
5. knowledge of vowel diphthongs and vowel digraphs,
6. knowledge of hard and soft c,
7. knowledge of hard and soft g,
8. knowledge of the schwa.

It is necessary to state that there are always exceptions to the rule. When doing this, review possible explanations for these exceptions. At this point an explanation of how the English language developed and evolved through usage, rather than by a set of rules, might be beneficial.

Structural analysis skills are closely related to phonetic skills. In using the structural analysis process, students are using their knowledge of word - form changes through analyzing prefixes, suffixes, roots, grammatical inflectional endings, and their recognition of compound words. They attack words by analyzing their meaningful parts and use these parts as an aid in recognizing new words. This is a very logical process, and it is closely related to word meaning and the function of a word in a sentence.

This process gives students a working stock of common Greek and Latin word parts and it teaches them to use these in combination with context revelation. Through structural analysis, the students are taught a self-help technique of unlocking meanings of unfamiliar words. As was stated before, this process when used with other processes, such as contextual clues, can give students a means of acquiring meanings of a number of related English words.

The best technique used to teach students how to use this process is through the use of the inductive approach. A pattern shown to students has the following steps:

1. examine the word for familiar parts,
2. if a part is recognized as familiar, but the meaning is unknown, try

to think of other words in which this part appears, and then reason out the meaning of the part,

3. return to the context, combines contextual clues with the structural clues and try to work out the word's meaning, or

4. if necessary, check with the dictionary.

There are some disadvantages, however, in using this process. Students have to be prepared for deceptive combinations of letters which resemble Greek or Latin word element that are completely unrelated. Also important is the fact that many prefixes and some roots have several distinct meanings and that at times the word element is often buried within the word or has had its form changed across the centuries. At best, the use of Greek and Latin word forms and their meanings usually yield only a general or partial meaning. It is rarely possible to add up the meanings of prefixes, roots, and suffixes, to arrive at a total precise meaning.

Teachers can improve some of these disadvantages. Below are some suggestions that have been reported to work. First, make a thoughtful selection of word elements for instruction choosing those which are more likely to unlock useful words. Next, teach parts that have a single, invariant meaning. If parts have more than one meaning, prepare students for these variations by teaching diverse meanings. Also important is the selection of parts that students readily recognize. Finally, students can be prepared for deceptive combinations of letters - combination which are identical with Greek and Latin wordsparts, yet are unrelated. Teachers should allow plenty of practice work dealing with this area. The work which includes derivations do a lot to promote vocabulary growth. If the teacher's objective is for maximal vocabulary development, the words selected should not already be known to the students. It is important that the teacher's objectives coincide with the learning abilities of the students.

The component of this process, that relates structural analysis and phonetic analysis, is syllabrication. A general understanding of syllables and accenting is required by students when using this process of unlocking new words. Certain principles which have a high utility usage can be reviewed with the students by using classroom activities. In a science content area classroom, syllabrication would not be used very often as part of a series of skills for unlocking the meaning of new words. One aid, however, that high school students can use is the meaning of compound words. Compound words often contain clues to the word's meaning, but again, students have to be taught that sometimes the meaning is quite abstract and is clear only in context.

Context analysis is possibly the most useful skills to possess when students have to choose the meaning of multiple-meaning words. When context clues are used, students have to use clues present in the language surrounding the words as a source of identification. This is a quick and valid process but it is not adequate as the only method. The use of context clues to find the word's meaning should be tried first, but the student's ability to use this method is dependent upon his/her background in the subject and also upon his/her general knowledge of the language usage.

Spache and Spache have suggested that as readers mature, contextual analysis becomes one of the most frequently used tools for unlocking the meaning of strange words. Phonetic and structural analysis continue to be very useful in the pronunciation of words but they become less useful for deriving meaning from unfamiliar content materials found in science textbook.

Instruction and practice with using this skill is important to students. The use of semantic context clues appears to be the best way of understanding an unknown language unit met within context. Unless the definition is given in context the word is in, the exact meaning may not have to be exactly precise for the readers to understand the author's message. If the absolute meaning of the words is needed, readers should look them up in the dictionary or ask

for teacher's help.

They types of contextual clues that students' need instruction in recognizing and using as vocabulary strategies are as follows:

1. State of meaning,
    a. statement in parenthesis
    b. statement in apposition
    c. formal definition
    d. subsequent statement
2. Definition by example,
    a. example done
    b. statement - example
3. Definition by synonym,
4. Definition by experience,
    a. life experience
    b. vicarious experience
    c. language experience
5. Definition by Description
6. Definition by Comparison
7. Definition by Contrast, and
8. Reflection of Intent, Mood, or Setting.

Sometimes clues within words, internal clues, can help unlock the meaning of a word. Emphasis at this point should be placed on teaching the high-yield, Greek and Latin prefixes, roots and some suffixes when it is relevant to our specific content areas. It would be uniwise to devote too much time on Greek or Latin internal clues that have a low yield of usage.

Whenever students are using contextual clues they also need their knowledge of syntax to help reduce the possible number of alternatives for an unknown language word in a given contextual environment. When using syntax, students would check for inflectional clues and markers such as noun, verb, phrase, and clause markers. They might need instructions using these so a diagnostic tool could be used to assess whether or not students can master these

skills.

Another important aspect worth noting in connection with vocabulary development is the skill of using connectives or signal words. These are keys in improving the precision of students' comprehending the written messages. Types of connectives are go signals, caution signals, turn signals, stop signals and relationship signals.

In training students to use contextual clues, choose materials written at the students' readability level as much as possible. Organized and systematic instruction will show students that the precise meaning of every unfamiliar word they meet may not be necessary for comprehension to occur. Teaching them to apply contextual clues first, to see if the meaning can be gotten, is a valuable time saver. When doing so, use context clues in various ways so students receive proper exposure to the amount of ways these can be used to get meanings of unfamiliar words. Contextual clues are useful in:

1. validating word analysis,
2. choosing meaning for a multiple-meaning word,
3. helping choose the appropriate, pronunciation of homographs, and
4. aiding readers in determining the meaning of a word author thought might have been too difficult for readers to determine.

Whenever one is using word processes to determine word meaning, the dictionary should be used as a last resort. Research has shown that if students turn to the dictionary to clarify the meaning of every unfamiliar word they meet, comprehension of what they are reading will be hampered. High school teachers have to be aware that students' dictionary skills need further refinement in application. When students' learn to make appropriate use of the dictionary they are strengthening their power to keep their vocabulary growing independently for life.

Here, as with contextual clues, instruction in using the dictionary must be at the reader's readability level. Important skills needed in this area are as follows:

1. selection of appropriate meaning by using,
    a. guide words,
    b. information about parts of speech,
    c. knowledge about multiple meaning of words,
2. figuring out pronunciation,
    a. knowledge of pronunciation keys,
    b. understanding of accenting and syllabrication,
    c. understanding of dictionary sound spellings and diacritical markings,
    d. understanding how to blend syllables together into a word with a correct accent,
3. interpreting the information on derivation,
    a. knowing its location in dictionary,
    b. appreciating what is found within brackets of entry word,
    c. understanding meanings of the abbreviations,
    d. aware of importance of studying derivations as an aid in retaining word meaning, and
4. using information of synonyms.

It is important to make students' aware as they are provided with reinforcement materials on dictionary usage, that even though most of the entries in the dictionary are single words, their concern is rarely with isolated words. They must bring the context (phrases, clause, sentence, paragraph) to the dictionary, for most words are adequately defined only within their verbal environments. It is wise to stress that one cannot depend on a dictionary as the major means of gaining vocabulary competence.

To summarize this report, a five part strategy is given to help students' attack unfamiliar words starting from first step to last step.

1. search the surrounding context for clues first,
2. examine words for "meaning parts,"

3. work out, syllable by syllable, the pronunciation of words - recalling context word was in.
4. try a shift in pronunciation again using context word was in, and
5. As last resort, reach for a dictionary.

The reasons students' need to develop good vocabulary strategies is that they do it in thinking with words, get their thoughts across to others in words, therefore, word meanings have to be well mastered. We, as teachers, can help our students master adequate vocabularies.

There are three different levels of concept attainment. The three stages are:

1. specific: learner has a single definition of a concept.
2. functional: learner has a functional understanding of the concept.
3. conceptual: learner has developed the concept of the word and can now categorize the word into different groups.

New concepts will be learned at the specific stage first which represents the concrete. As meaning of word is better developed, the student may eventually understand the conceptual meaning of the word which is now dealing with the abstract. The presentation of concepts will determine the level the concept will be learned.

Activities:

New Concept: elemental metals

specific: 1st Act. Working at the concert level, one activity could be to demonstrate in front of the class a number of elemental metals. Have students draw a list of similarities that can be used to conclude what characteristics metels have.

2nd Activity: In their vocabulary exercise workbooks have students look in the dictionary for the definition of the word and to write it down in their notebook. After this, have students use the word in a sentence.

These activities are at the concrete level. Activity 1, is providing students with direct experiences.

Functional:

They would be given a worksheet dealing with analogies.

Direction: Complete each analogy. Write O, if it states the opposite and S, if it is the same.

1. _____ Cl is to nonmetal as Na is to _____.
2. _____ Metals become positive ions while nonmetals become _____.
3. _____ Non malleable is to nonmetal as _____ is to metals.
4. _____ gaining electrons is to nonmetals as losing electrons is to _____.
5. _____ nonconductor of heat or electricity is to Cl as conductor of heat or electricity is to _____.

This activity falls halfway between being a concert or abstract type of exercise. At this stage students are learning the functional meaning of the concept "elemental metal."

2nd Activity

In studying the functions of metals, a good activity to use would be to provide a list of elements from the periodic table and have students list which of these elements show the following characteristics:

1. have a metallic luster when polished.
2. good conductors of heat and electricity.
3. become positive charged ions during a chemical reaction.
4. have 1 to 3 (possible 4) volence electrons
5. are malleable.

Conceptual: any activities at this level deals with an abstract level of reasoning.

Activity #1 Given a list of elemental metals and nonmetals students would be required to predict what types of compounds they would form during an ordinary chemical reaction. It should be noted that students at this point also need to have a conceptual understanding of nonmetals.

Example: Na + Cl → NaCl
(metal) (nonmetal) compound

Activity #2

Students would be required to set up a chemical reaction which would demonstrate some of the properties that are characteristic of metals.

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NOVEMBER-DECEMBER REPORT

DRA & SQ3R

TITLE IV: PART C
DEVELOPMENTAL GRANT

SCIENCE

Claire LaBrie

In order to succeed in content area courses, students have to grasp the meaning of generalizations and difficult concepts. Students who can bring into the course, past experiences to draw upon have an easier time confirming and enriching the already acquired concepts. Students of limited experiences may possess narrow conceptual framework in a content area and will experience frustration and failure unless the situation is remedied.

Guilford describes three major types of thinking that takes place within a content area class. The first, convergent thinking, occurs when students gather together from numerous sources various aspects of information about a topic in order to arrive at a carefully thought out conclusion. The second, involving elaboration upon given information which may go in many directions, is known as divergent thinking. Lastly, evaluation, requires students to know if two units are identical or not and whether information is workable. The thinking that students uses depends on two factors: (1) materials they are working with and (2) the teacher and her/his creativity. Therefore it is necessary for teachers to use every strategy possible to ensure that students develop certain study skills that they can utilize to get the most learning possible.

Certain teacher-directed strategies are available for today's educators to ensure that students have the basic learning tools available to them. In 1961, Bruner came up with a theory which states that students should become involved through the use of modified discovery when discovering new ideas and concepts. This helps students reorganize evidence in such a way that they are able to go beyond the evidence and draw new insights. In 1963, David Ausubel suggested the use of advance organizers where the teachers would present important generalization to students prior to readings or discussions of new introduced concepts. These two theories have been combined into a new approach which has proven to increase student's comprehension and this approach will be presented in the realm of this paper. The approach referred to as "Directed Discovery

Learning," helps students discover learning. It can provide students with a stimulating introduction to new concepts. It is more structured than Bruner's and requires more active participation than Ausubel's approach. The Directed Discovery Learning approach is similar to the Directed Reading Thinking Activity which in short is known as DRTA.

The DRTA is a technique for teaching comprehension skills. It was developed by Russel Stauffer (University of Deleware) from his concern that the Directed Reading Activity was not sufficient for the task of allowing students to independently meet their own purposes for reading. The DRTA has shown itself to be useful in developing within learners a systematic strategy for comprehending written material. It is a scientific method or problem-solving approach to reading instruction.

The primary objective of DRTA is to develop critical reading skills. If learners are given a passage at their instructional reading level, they should be able to use evidence of a literal nature to predict and test hypothesis concerning:

-sequence of events,

-plot outcome,

-emotional reactions,

-cause/effect relationships,

-character attributes, and

-likeness and differences.

It should be readily apparent that DRTA is a technique by which instruction in comprehension skills aid the students to synthesize the specific and segmented skills which they may have acquired in more narrowly-defined lesson situations. While a single DRTA would not be sufficient to cover all listed skills at one time, neither would it be best used only to cover one. At the time the material is being considered for its use, the teacher should decide which skills the

the materials lend itself to, and then teach these necessary skills.

The DRTA may be used with fiction or non-fiction material. With non-fiction, like in the case of science, the beginning procedure of presenting initial evidence is often changed where the teachers begin the activity by asking a key question and proceeds to group initial predictions on the chalkboard under who, what, when, where, why categories. Where DRTA can be directed toward the development of specific reading skills, it is wise to stress that alot of its usefulness results from the emphasis on process.

One difficulty that can arise when using DRTA, is teachers encounter students who are reluctant to take the risks required to make predictions. Teachers can use techniques where the students are made to feel more comfortable in making predictions. Once they see that there are no "right" answers, only reasonable and unreasonable predictions, students will become more willing to participate in such a task.

Directed Discovery Learning is used to provide unexperienced students with a mean for understanding the experiences.being taught. This inductive approach which is teach directed helps to reduce students' frustrations. It can be broken down into four major steps and these are (1) Preparation (2) Silent Reading (3) Comprehension Check and (4) Follow-up Activity. The following section of this paper deals with the research findings concerning these four stages.

The "preparation" phase has defined steps which are prerequisites to learning. Motivation and introduction are part of the first steps. Pupils learn best the things they are interested in. Therefore it is important to stimulate interest by relating the new concepts to be learned to the students' experiences. Techniques used for motivation are as varied as the teachers who employ them. Students can be made to study things they aren't interested in, if purpose for learning is evident. Reviewing background of concepts should

occur during this stage because relating new concepts to experiences students already have is valuable during the introduction. The purpose for this is that it provides a context into which new information can be fitted, subsequently enlarge into a major concept or possibly explored in deeper depth.

The second stage, "concept clarification," aids the students in acquiring necessary information needed to fully understand what is to be presented. Concepts and information presented must have meaning and significance. Students need to know "how" this can help them. An effective procedure is to consider individual differences of students and deal with this at this stage. All students need to be actively involved in order to learn. Therefore by using direct or vicarious experiences, teachers can relate concepts to students who have had no experiences with such a topic ensuring the probability of learning to take place. This produces a more positive emotional attitude in these students and proves valuable in determining how well they react to the new introduced concepts. Students can be turned off by "foreign" topics. Adjusting context introduction to student's background and skill proficiencies is a must if students are to be able to understand the body of the content.

When clarifying concepts, it is also of great importance to introduce the vocabulary pertinent to the fundamental concepts being covered. If materials are kept at the students' instructional level, no more than five vocabulary words or concepts should be introduced at this point. If the need is greater, it may be wise to select materials that are geared at a lower level of readability. The "word stoppers" introduced should be words that are not adequately explained by the author and which are significant in clarifying the underlying concept. Discussion of these words should be brief and as integrated as possible with total readiness activity. Students can use past experiences when bringing meaning to these words. A review of word structure to aid word recognition can be called for if necessary to ensure a successful understanding of the word.

The terms which are less basic to the understanding of the information are left for the students to learn by using the various techniques of word recognition that they possess.

After the preparatory steps have been completed, a review of the skills that will be called on during this unit is advisable. It is fruitless to merely tell students what skills they should be using. They need structure that will demand them to apply these skills and the reinforcement of the application is necessary. At this stage, a teacher designed study-reading guide can be produced which would provide for individual differences and ensure success for all. The guide is one method used in differentiating assignments where students who are weak in certain areas of study skills can be given directions and guidance yet their learning processes will still remain high individualized. This would come about only after a formal or informal assessment had been done to determine the strengths and weaknesses of the students' study-reading skills. If the skills called upon have already been mastered by the students, a quick review may be all that is needed at this time. Knowing the skills needed by which students can assimilate and react to new concepts, teachers can then construct reading guides which will help this aim. This stage can be seen as a preparation for the task coming. It guides the students to apply their skills and concepts while encountering the task at hand. A goal for teachers and students alike is for student to become independent during the learning task. However, before this goal can be reached, students need much simulated experiences and guidance which should be provided for by the instructor.

If any pertinent reading skills are needed for comprehension to occur, they are developed where apparent needs of the class and individuals are noted. The skills are introduced at their specific level of understanding and are developed to a more abstract level if desired. Care, however, should be exercised so that the readiness phase does not become heavier than the reading phase.

The last stage of the "Preparation" phase is "purposes for reading." This involves teachers and or students establishing purposes for reading. Teacher-initiated purposes are most frequently questions raised prior to students reading. Students shoudl be aided to analize questions in relation to the kinds of answers expected where eventually students could independently set their own purposes for reading through the use of effective questioning strategies. A worthwhile goal is for the shifting of responsibility from teacher to student to materialize. Students are more motivated, interested, and will comprehend what is read better if they set their own purposes for reading and practice making predictions regarding possible outcomes. As students read, they compare their predictions to those of the authors and this requires students to accept, reject, extend or modify either his predictions or what the author is saying about the content of the materials. Teachers' role may be seen here as assisting pupils by raising questions that help set purposes and guiding students to recognize their own errors when they first set out their own purposes. This last stage helps students to predict and reason out their predictions by setting out to prove or test it.

Other techniques utilized in setting up purposes for reading are available. Previewing content of the material is one such technique. Students are helped to recognize a general outline by checking the titles, sub-headings, pictures, and graphs. Another approach used is when the teachers' tell students what they want in general.

The second phase of DRTA is "silent reading." Students read the content material silently. Questions asked before reading are mentally answered during this phase. If new questions arise as students read, these also are answered. The reading is done therefore to clarify the set purposes for reading and adjust any that need adjustment. Individual help can be given to students during this time when it is needed and demanded.

The third phase is "comprehension check." A discussion of the pre-reading

questions can take place where the students are allowed to add to the discussion any questions that they had come up with during their reading. Students can compare what they had expected to find and what they did find. If any misconceptions are noticed by the teacher, action can be taken either then on the next day to clarify the misunderstandings. This phase becomes diagnostic in nature when teachers use informal devices to see if students comprehended the content taught.

The fourth phase, "follow-up activity," is used to develop and extend interests, attitudes, and appreciations. It is designed to increase students' knowledge and give students the opportunity to apply basic knowledge to related problems. It develops the students' ability to evaluate data and to conduct research on a problem related to the content if necessary. The basic aim is for students to apply the skills and information they have been taught.

To summarize the DRTA approach, certain considerations must be undertaken. The purpose of this approach is to guide students in their thinking. There need be no specific time limit to be placed for DRTA and if materials are not of specific importance, the last two phases can be deleted.

SQ3R is an approach developed by Francis Robinson in 1961 to aid students in improving their comprehension of the materials they were using. Research is also available that proves that the use of SQ3R or a related strategy, aid students in retaining the materials learned for a longer time period.

SQ3R is a student-directed strategy. Students undertake a series of steps to ensure better comprehension. The letters in SQ3R represent the following: survey, question, read, recite, and review. This technique aids students in making sense out of what they read. They take information through their sense organs and process this information via their memory systems. This information is stored where it will be available for later recall.

Since we are constantly being exposed to information, it is hard for our brains to process everything. The rate at which new input can be processed is limited by the rate at which the brain can process this new information. Components of SQ3R are designed to aid the processing of incoming information so that readers can deal with more of it and more effectively. When students survey the materials to be read, they are preparing the processing system for what is coming. It defines the nature of uncertainty and allows the brain to know how the new information will be categorized. When the process system knows what is coming, it can deal with it more efficiently. The "Question" stage allows students to evaluate and select the new information needed to fill in the gaps in their cognitive structures. Because of physical and psychological limitations, humans can not process all incoming information, however, this stage allows students to choose what information they need. After the material has been read silently, students recite answers to the questions they had asked while establishing a purpose for reading. Reciting slows down the input of information, thus giving the processing system time to transfer the information. The information processing continuum contains an immediate memory and a long-term memory where items are stored for later recall. It takes about 5 seconds for an item of information to be transferred from the short-term memory to the long-term memory. Reciting allows enough time for this process to occur.

Research shows that most forgetting takes place right after the learning task has been completed. If students were to review immediately after the task, this would interfere with the forgetting process and result in a more complete retention of the material.

There is a positive relationship between skill in reading and success in content subjects. Therefore, teachers should help students acquire necessary study-reading strategies available for ensuring students' success in their content area. Most secondary high students will need to be taught and guided in the use of such an approach. Students have not been shown how to prepare themselves

to read. If they have, most have been unable to transfer these preparation skills to new reading assignments. As content area teachers, our responsibilities are to help students learn the subject and to aid students acquire the important skills that are esential for comprehension to take place. An effective way that teachers can carry out such a responsibility is by introducing students to the SQ3R technique and through guidance, show the students that this technique does work.

When introducing the SQ3R technique to students, research stresses the importance of offering this "how to study" technique early in the course. At this time, however, students do not always recognize a personnel need for such. This can be fixed by creating a sense of need during the first few days of class. Teachers may simply assign a representative section of a chapter for reading in class or at home. When students finish this task - before any classwork on the content is done, teachers ask questions of the type that the students would be expected to answer all year. The shallowness of their reading will be brought home when students discover that they know less than they needed to know about what they've read. The stage is then set for "how to read it" sessions. How it is done is up to the teachers, however, make sure the study skill instruction is done during the content area lessons, because this is where the skills will be used and are needed. It makes sense to teach them in the context they will be used.

It will be necessary to show the students that this study-reading technique is quite effective. A demonstration on how SQ3R works should be one of your instructional goals. Another goal is to get students to use the method in their everyday reading. If rewarded for successfully using the method, students may be more apt to continue using it when the "how to read it" session ceases.

There are certain steps that can be used to instruct students as to how to use the SQ3R technique. The first step has been mentioned and that is to make

students recognize a personal need for such. A "send off demonstration" will determin how successful teachers will be at selling the technique, therefore, teachers can report to the students the research results on the success of SQ3R to stir students' interests. As students are being taught how to use this technique, guidance from the teacher is a must. Students also should be allowed to do their own adaptation. Where they can use the approach in the way that works best for them.

A method that works is to introduce each of the steps individually and allowing practice time where teachers can provide necessary aid. To practice the survey step, teachers can lead students to make their own discoveries about the techiques and values of surveying.

When the class is given an in-class assignment, the time may be right for this surveying step to be practiced. By encouraging students to find the hidden outline the author has used to convey his materials, surveying may become an automatic step. Students should be encouraged to practice widely and perfect the new technique. When a section is about to be read, questions can be formulated, first, by the teacher so students can recognize this step as setting a purpose asked before each section to read, improves comprehension. Provide in-class practice time where students learn to become independent at asking their own questions which will force them to focus on the meaning of the materials to be read. Advise students to ask interpretive type questions as well as the literal type. The types of questions that they ask will determine the level that comprehension takes place. When students have mastered the above two steps they should recognize that the reading step becoming more meaningful. The fourth step occurs once the reading is done where students ask themselves just what is it that they have read. Much guidance will be necessary in showing students how to coordinate the Questions, Read, Recite steps into a smooth operation. Teacher prepared guide sheets can allow the students to actually perform these steps in sequence. Teachers at this point can instruct students on some short

cut techniques in note taking, keeping in mind that students should be allowed to accept and adapt these techniques to fit their purposes.

When the entire sections are finished, this becomes a convenient place for teaching the final step, "Review." Students are instructed to return to the total section for a once over. This should be a rather quick step that clinches retention. This should be a step where students are actively involved.

SQ3R is a lifetime tool which influences students' reading power. It captualizes on scientific learnings and allows for easier learning and longer retention of what was learned. When introducing this technique to students, the practice of it should be realistic and reinforced as needed over the weeks and months that follow the instruction.

DRTA and SQ3R have been compared to each other. Keep in mind however that DRTA is a teacher-directed technique where as SQ3R is student-directed; however, both are strategies developed to improve students' comprehension and have been very successful. The following is a diagram comparing the two.

DRTA	SQ3R
I. Preparation	Survey
II. Setting Purposes for Reading	Question
III. Silent Reading	Read
IV. Comprehension Scheck	Recite
V. Follow-up Activity	Review

Guidelines that teachers can use when introducing a DRTA for the first time is presented below.

(1) Provide a learning atmosphere where you encourage students to ask questions.

(2) Use demonstrations, interest centers, students' questions to generate curiosity.

(3) Seize upon questions and interests that are related to your education goal for the pupils.

(4) Analize problems or questions raised with the class and let students suggest ways to a possible solutions.

(5) Include in guide sheets processing skills such as:

observing	predicting
describing	experimenting
comparing	communicating
classifying	analyzing
inferring	making deduction

(6) Be prepared to give added information as needed.

(7) Provide students with opportunity to verbalize concept learned after activity.

(8) Following the investigation, lead pupils to proper materials to clarify concepts if necessary.

(9) Modify your guides and activities to the students level of cognitive development.

(10) If first lessons are "flops," ask for suggestions from the students.

A Directed Reading - Thinking Activity

Physical Science

Author - Ramsey, Gabriel, McGurk, Philips

Title - Holt Physical Science

Pages - 285-289 "The Noble Gases"

Suggested Level of Book - 9th Grade

I. PREPARATION

A. INTRODUCTION AND MOTIVATION

You will see why the valence electrons are so important when one determines how an element will behave during a chemical reaction. Show film #647 "Noble Gases" as part of the introduction.

B. CONCEPT CLARIFICATION

Relate the term "stable" to some of their past experiences. Through the use of discussion, concepts such as comple outer shell valence electrons and ionization energy will be clarified.

C. "WORD STOPPERS" - VOCABULARY

1. Stable electron arrangement - briefly discussed in part B but not in depth because author has defined it quite well in context.

2. Valence electrons.

D. SKILL DIRECTION

At this time, a review of how ions are formed would be wise. Another concept that may need reviewing is electronic configuations so that students can focus in on the valence electrons.

E. PURPOSES FOR READING

1. Explain what is meant by a stable electron arrangement.

2. Be able to predict whether a given atom will gain or lose electrons to become stable.

3. Figure why the noble gases are considered to be inactive elements.

II. SILENT READING

III. COMPREHENSION CHECK

Questions such as "How can you tell what makes an atome "Noble"?" will be discussed. An activity having students predict whether a given atom loses or gains electrons to become stable will be done. This activity is a diagnostic tool used to check whether students have mastered the concept of "stable electron arrangement associated with the noble gases."

IV. FOLLOW-UP ACTIVITY

1. Answer textbook questions.

   a. page 302 - questions 3,4,5 (Review Questions)
   b. page 303 - questions 4,5,6 (Review Exercises)

2. Resource Book, pages 129-130. Worksheet reinforcing the learned concept.

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Project CAPABLE

CLASSROOM ACTION PROGRAM:

AIM: BASIC LEARNING EFFICIENCY

"to make each student a more capable learner"

CO-DIRECTORS

Paul Germann
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JANUARY REPORT

STUDY SKILLS

TITLE IV: PART C
DEVELOPMENTAL GRANT

SCIENCE

Claire LaBrie

Study skills are made up of both reading and thinking skills. They are skills. They are skills student's use to understand and retain what was read. Students need to acquire these skills so that productive independent study can occur. These study skills can be classified in five major areas which are as follows:

(1) Obtaining information

(2) Evaluating Data (Critical Reading)

(3) Organizing and summarizing

(4) Retaining what is read

(5) Special study aids

These skills are aimed at helping students become independent in the art of learning. Obviously, before such an objective can be accomplished, students will need instruction with guidance in acquiring the skills found in those five areas.

The content area teacher is responsible for teaching students the necessary study skills needed in understanding their particular content. There is yet no research available that answers the question concerning when study skills need to be taught. Common sense and sequences need to be considered when weaknesses in some of the skills are detected.

Teaching the skills as needed, once assessment as been done, at various levels on the basis of complexity is probably the best rule to follow. Diagnostic tests, which are teacher constructed, can be used to asses if students need help in mastering any of the necessary study skills needed in that particular content area. In short the objective for teaching study skills is to enable students with the necessary tools so they can study efficiently and independently in variety of learning situations.

The task is so simple, yet many of our high school students lack many necessary study skills. Why? One major reason is that assumptions are made by content area teachers that students have previously been taught these skills. Some also beleive that by this time, if these skills were not taught, students have

developed habits and skills on their own through some sort of maturing process. Another reason is teachers are not familiar with the necessary skills so the process of teaching them is neglected. A definite lack of methods of appraisal in determining the progress of students in learning the desired skills has also been a contributing factor. As these are viewed, it is noticeable that any of these factors can be remediated with the content area teachers becoming active participators during the process of remediation.

In organizing a good program which is geared to teach some needed skills, four essential features need consideration. "These are (1) the instruction should be geared at the students' instructional level keeping in mind individual differences and needs. (2) the study skills taughts in reading programs should be correlated with other instructional activities. (3) evaluation of students' achievement and growth should be done at regular intervals. (4) an amount of praise and encouragement should be given to students gearing them toward increasing independence in the use of these skills."[1]

The next step would be to decide on which approach is appropriate to employ while teaching the skill(s). Neil Reid, in one of his publications, reported on a number of different approaches that could be considered. If the functional-incidental approach is used, the skill(s) are not arbitrarily selected, but rather, they evolve from the materials being used in classroom instruction according to the teachers' judgement. The Shores and Shoddy (1971) approach is set up in four stages. Stage one involves the introduction and clarification of the skill. Stage two, provides practice using the skill in a controlled situation. Stage three reinforces and culminates the first lesson on a particular skill.

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[1] Reid, Neil, "Developing Study Skills in the Reading Process," ERIC 154-333 Published August, 1975.

Thes first three stages may be completed in one lesson, while stage foru would provide the students with further practice in the application of this skill. Content-oriented approach delegates the content area teachers as being totally responsible for developing the skills relevant to their content area. The next approach has been designed for high school teacher and is referred to as the Textbook Approach. Using this appraoch, a careful analysis of the content area textbooks is done by the teachers where skills required for comprehension to occur are noted. Assessments are then done to determine if students possess such skills and for those who don't, instruction is then given. The Curriculum, itself can be used in skill teaching, where the teachers design units and plans to integrate skills instruction are included. The Skill-Oriented Approaches is geared to the specific skill needs of students, rather than to the consideration of skills for that content area. It seems that whenever teachers select one of these approaches, thought should be given to using a combination of approaches instead. Whichever one is chosen, students need plenty of practice time, along with guidance, from their teachers for it takes time to change established study habits, and it may not be easy. An increased use of study skills is brought about when students realize is brought about when students realize a need for efficient use of study skills. Before a program of instruction is introduced, students need to become aware of their problems with their study habits and also they need to want to improve these deficiencies before any program of instruction can become effective.

Having established how teachers can go about planning a program of instruction, attention will be given to the five major areas of study skills.

Obtaining Information:

The study skills needed by students while obtaining information are as follows:

-being able to

a. alphabetize

b. use reference tools

c. choose appropriate sources

d. use library and its resources

e. locate information using

1. table of contents

2. index

3. card catalog: arrangement of cards

a. author's card b. title card c. subject card

4. Reader's Guide

5. almanac

6. appendix

7. glossary

8. encyclopedia

Acquiring these skills aid students in their studies because they are able to determine the answers to many questions. Questions, such as, (1) what source(s) is best?, (2) Where do I find the source?, (3) Once the source is located, how can it be used to determine if it might have the answer to what is being sought?, (4) How can one decide if the answer provided is appropriate?, (5) How does one decide what is worthwhile reading: what is not?, (6) Is what one is reading valid, up to date, unbiased?, (7) How does one report any relevant materials? can be answered using these skills.

Evaluating Data:

In this area, skills such as the following are found:

1. ability to judge relevancy of materials

2. ability to verify facts

3. ability to judge accuracy of statements

4. ability to accept or reject statements on the basis of what is known.
5. ability to recognize the significance of the content.
6. ability to recognize important details.
7. ability to recognize main idea.
8. ability to locate topic sentence.
9. ability to realize author's purpose.

These skills consist largely of abilities in identifying important ideas and their related details in a paragraph or a larger unit of writing. Students need these skills to spot essential materials quickly and to weed out the unessential. Teachers who have isolated skills which students are weak in, need to provide instruction for one skill at a time, alowing practice for each separately before going on to the next.

The ability to recognize main idea is an essential skill needed by all whether one is reading or listening to a lecture. When students lack such a skill, care needs to be taken. Teachers need to provide numerous activities which would give practice finding main idea in beginning, middle, and at the end of a writing unit. While practicing this, students become increasingly aware of the extra information added that may detract one's attention from the main idea. This helps students understand the differences between materials that are relevant and those that aren't. Having mastered these abilities, students become selective in their search for answers to problems.

Organizing and Summarizing:

Skills such as follows are found under this category:

(1) recognizing organizational patterns such as

a. time
b. sequence
c. cause/effect
d. compare/contrast

2. being able to relate ideas
3. being able to take notes
4. being able to write an outline (single paragraph - several paragraphs)
5. being able to skim and scan
6. being able to follow directions
7. being able to determine relationship between paragraphs
8. being able to summarize important points
9. being able to recognized different kinds of signals: (half signal and full signal)

Students need these skills in order to see logical interrelationships among the date. These skills are very essential when studying science context because the comprehension of interrelationship between data is so valuable. David Shepherd points out that there are two aspects found in orgainizing information. Students, he says, note as they read the organization used by the author. Different types of organizational patterns employed by authors are listed below.

"(1) Explanatory Paragraph: its major function is to explain, inform, or tell about something factual - major orgainizational units used in textbooks.

(2) Definitional Paragraph: its function is to focus on clarifying the meaning of one or more words, phrases, or clauses. The words are usually technical vocabulary which students need to know for comprehension to occur.

*These first two types of paragraphs are frequently found in science textbooks as major organizational units.

(3) Introductory Paragraph: useful in aiding the reader's attention on an area and in a given direction for further reading. These may define new words, but are very broad in nature.

*The text used for my Physical Science class employs this type of paragraph before every new section within a chapter. This text also has at the end of each chapter the next type of paragraph at the end of each section.

(4) Summarizing and Concluding Paragraph: if at the end of a chapter, its function is to restate the most important ideas previously presented by repeating major concepts, redefining terms and/or refering to important illustrations given earlier.

*If found at the beginning of a new chapter, its function is to serve as a transitional unit between the chapter just ending and the one just beginning.

(5) Transitional Paragraph: serve as concluders of one idea just presented and introducers of another new idea. These provide a temporary stopping place for reader; it's also a good place to reflect on what was read and to set new purposes to read what is to come.

(6) Narrative Paragraph: illustrates main points to be developed by drawing the rea-ers' attention to the material about to be read. This serves as a motivational device.

*This technique is used in my Holt Physical Science book in some of the chapter introductions.

(7) Descriptive Paragraph: its function is mainly descriptive, carrying important information which students need to read carefully and accurately."[2]

The second aspect allows students to be able to produce their own organization, relative to their purpose, through their notetaking and outlining. This aspect allows the student to become active during study. The teacher's role is to teach the desired skills, and once students have mastered the basic form, they can then develop their own personal form as long as they can see interrelationships among ideas.

When teaching these skills, it may be very practical to use the students own text. The typography of many text leads well into the instruction of

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*Robinson, H., Teaching Reading & Study Strategies, Boston: Allyn & Bacon, Inc., 1975.

how ideas are separated one from another: Example-information is divided under main headings and subheadings. These features help students recognize important ideas and their placement. Students may then be taught to discriminate between major and subsidiary topics. After these points have been understood, a formal outline form can be introduced. Preparing outline of short and long sections is the final step in the process of learning to outline what is read.

Summarizing:

The ability to summarize depends on these skills:

(1) ability to identify important ideas of the writer with essential details

(2) ability to omit irrelevant facts

(3) ability to place the information in some sensible order

(4) ability to express in their own words what the author's ideas is

Since science content is usually presented in a compact form, care needs to be taken as students are writing a summary not to overlook important points. Students will need exercises in restating important ideas before they can do this independently. When students do any of these mentioned activities, they utilize not only the skills in this category, but also some from others as well.

Retaining what is read:

This category includes skills such as:

(1) direct application of study-reading technique, example: SQ3R.

(2) students develop independent purposes for reading.

(3) students see relationships between purpose and directions.

Special Study Aids

This includes skills such as the students' abilities to read

(1) maps

(2) charts

(3) graphs

(4) tables

(5) diagrams

(6) cartoons

(7) scales

(8) legends

(9) symbols and

(10) keys

Also students need to be able to interpret the above in relation to the content. These devises are included in the student's text book to add to the understanding and interpretation of materials, if they are read properly. Many students overlook these, and in a content course such as science, they can not afford to pass these on.

Reasons why students may overlook these Study Aids may be because

(1) little emphasis are placed on its use,

(2) teachers feel the aids are too elementary for the students or

(3) teachers feel the use of the materials is so obvious that they fail to mention them.

These, however, are incorrect assumptions. Most high school students don't know how to use these study aids effectively or what purpose to keep in mind when using them. Science students are bombarded with numerous special study aids. In using these effectively, abstract concepts can be developed at a lower level of learning (materials can be made more concrete). For example, charts, are used to show sequence, organization, process, comparison, development and flow of many types of information. Since tables in science present

statistical data which supplements the descriptive passages in their text, students have to learn how to read these as well as charts. Whether the students are reading charts, tables, or graphs, etc., they need to possess two major abilities. They have to be able to understand what is stated directly and also what is implied. Their ability to do this depends on their experiential background and their skills employing these special study aids. When teachers provide instruction in the use of these skills, using students textbook provides a more realistic activity where students can recognize a need for such skills.

Students need to master certain study skills because the ability to study efficiently depends on this. Each study skill needed in a specific content area needs to be taught by that teacher. This can be accomplished by using their textbook where the content will present no real difficulty other than the skill being taught.

There has already been mentioned in this paper, some of the study skills needed by science students in order to study efficiently. The rest of this paper will deal with other study skills needed for science students to comprehend the content with greater ease.

The ability to obtain information proves very valuable in a science course. Most of today's science is based on the gathering of data; whether its new information discovered through experimentation or older information, which has been published, resulting from past experiments. The knowledge of the proper usage of the library is needed if students are to conduct any research. Also, as important, is for science students to know how to use their textbooks. Their book is filled with information just waiting to be read. They need to know how to select pertinent information if the data gathering is to be as precise as possible during a certain allotment of time.

Once these data are collected, students will need to know how to evaluate them. They will need skills in judging which material is relevant and which

isn't. If unable to do this, their conclusion may well be incorrect. The ability to take all the recorded data and reach a valid conclusion requires students to locate and recognize the important variable. Whenever any of these things are done, a written record needs to be kept. This will demand some note-taking and outlining where students may also be required to follow some directions. Failure to do this properly may influence the direction the data takes and a misconception may arise, As one can see, science students need to acquire most of these study skills especially those mentioned under the Special Study Aid.

Successfully science students will be not only good word readers, but also, will possess the ability to draw inferences and to apply what is known to a new situation. Content area teachers should administor skill informal inventory test and use the results to prepare their curriculum. Also, helpful is a well constructed observation checklist sheet, which provides teachers with answers that may be helpful for instructional decision making. Testing the students' understanding of skills is like being at the starting line where the road to successful comprehension includes a mastery of all the necessary study skills pertinent to the content area they are in.

A Directed-Reading - Thinking Activity

Physical Science

Author Holt

Title Physical Science

Pages pages 333-335 Experiment on Typical Chemical Reactions

Suggested Level of Book 9th grade

I. PREPARATION

A. INTRODUCTION AND MOTIVATION

This activity will help to answer your questions concerning "heat." You will observe certain chemical reactions where heat is one of the reactants while in others, heat is one of the product formed.

B. CONCEPT CLARIFICATION

The concepts of exothermic and endothermic reactions will be briefly explained followed by a class demonstration allowing the students hand-on experience with these two terms. Included in this stage is a review of what products are and what reactants are.

C. "WORD STOPPERS" - VOCABULARY

(1) endothermic reaction: a chemical reaction which absorbs energy (where heat energy is one of the reactants)

(2) exothermic reaction: a chemical reaction which gives off energy in the form of heat (heat is one of the products).

D. SKILL DIRECTION

See additional page.

Skill involved in this experiement is the ability to follow directions.

E. PURPOSES FOR READING

1. Explain how to recognize different types of chemical reactions where a change in temperature occurs.

II. SILENT READING

III. COMPREHENSION CHECK

1. As the plaster of paris hardened, did the cup become warmer or colder? What type of reaction was this?

2. When HC,H_3O_2 is added to $NaHCO_3$ (baking soda) what did you observe? (vinegar)
What type of chemical reaction does this imply?

IV. FOLLOW-UP ACTIVITY

Do a matching activity (page 336) dealing with compounds having been observed during the chemical reaction.

D. SKILL DIRECTION con't.

During this part of the DRTA lesson, I will instruct my science students on the steps to follow when learning to read to follow directions.

Content used will be their text: allaboratory section.

Steps to setting up a Lab Report following directions.

1. Read the introduction carefully. pg. 333

2. Look over the objectives of this Lab pg. 333 and state in your own words the purpose of doing this lab.

3. Next check the section on page 334 that show you which materials you need to perform this lab. Write these materials under the material: subheading in your report.

4. The next section of your lab report deals with procedure. Together the book will be examined so students can notice the different typographical aids employed to outline the procedure they are to follow. An outline of these procedure will be written down on paper. (I am assuming at this point, that the students have mastered outlining skills.)

*These four steps would possibly take 1 to 2 class periods

5. They are then ready to proceed with the lab expiment. Having gotten the necessary materials, they start doing the experiment and collecting data which is placed under the data section. They perform the experiment using the outline found in the procedure section following one step at a time in sequence.

6. Once the steps in the procedure are completed, an analysis of the data is done. The analysis is aided with the use of guided questions so that students can arrive at an educated conclusion once questions and analysis is finalized.

7. Conclusions: stating in their own words, students come up with a plausible theory which can be employed to explain what was observed.

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FEBRUARY REPORT

"MANAGEMENT TECHNIQUES"

TITLE IV: PART C
DEVELOPMENTAL GRANT

PHYSICAL SCIENCE

Claire Labrie

Classroom Management Systems provide content area teachers with a plan of action geared at meeting some of the individual reading needs of their students. At the secondary level, most science classes are grouped homogeneously, however, a span in reading level among the students is common. Researchers have evidence showing that the range of reading level among students within a class widens as students enter secondary schools. Many reasons have been cited to explain this range of difference. It seems that secondary students not only have a range in reading level, but also have a range in specific reading skills needed to be mastered. Other factors contributing to the range of difference are, students have different motivational patterns, different interests, different experiential backgrounds tied to socioeconomic differences, different learning rate related to intoelligence or learning style, and finally they have different learning modalities.

The roles of content area teachers requires them to determine the ability and achievement levels of their students and instruct them in such a manner that growth in learning will take place. How teachers go about meeting these challenges depends upon many factors. Teachers need to make instructional adjustment to meet the needs of all their students by selecting approaches and materials appropriate to meet their criteria. The selection of certain grouping or organizational pattern will depend upon certain aspects such as the physical building itself and the teachers' strengths and weaknesses. There is no one organizational pattern that is appropriate for all students, therefore, the ability to be flexible is an important factor to be considered (flexible in types of grouping patterns used and also in the size of the groups.)

The criteria used to form groups or decide what type of organizational patterns teachers select, after having carefully diagnosed and observed students' strengths and weaknesses, are as follows:

1. Achievement level: The purpose for selecting such a pattern allows students to study the content at their instructional level of comprehension. This allows students the ability to succeed because they can acquire the skills at levels that are comprehendable for them. One drawback to such an approach is that students may feel labeled if they happened to be in a low group.

2. Need: Whenever this criteria is used, the group is formed so that a specific skill can be taught for the students within the class who have a need for mastering such. It tends to be adhoc in nature because this group is formed for a limited time where instruction is given and once the skill has been mastered, this group is no longer in existence.

3. Interest: This allows students which are at various reading levels to read a topic all of them enjoy. The books read on the topic in question will be at the students' independent level, allowing an expansion of interest through the opportunity to investigate additional information. Not only is this useful in giving practice and application of certain skills but it is also very motivating. However if used all the time, it may impede the quality of content learned.

4. Research: The reason for such is to allow students to investigate aspects of the subject being learned in different kinds of media. It allows the students to practice and apply reading-study skills, such as those listed under the area of obtaining information which reinforces and encourages students to become independent learners given the necessary opportunities.

5. Social: This type allows students to work on certain assigned topics with classmates of their choice. This helps to motivate students but if not carefully monitored it can be harmful in that students are not receiving the opportunity to work with a wide number of their peers.

6. Guidance: An approach as such allows desperate students to work together in order to foster greater social development and tolerance. It brings opportunities for students with different interests, abilities, and competence

to work together. Unless students understand why this group is formed and how it is to function, it may prove to be very unpopular and detrimental to the students.

7. Duo (Pair Grouping) or Triplet: This allows two or three students to work on a problem to the mutual advantage of each. It allows students to give and receive special help but it could exploit students if teachers misuse the approach.

8. Tutorial: Students with an intensive need. If a special skill due to lack of competence is given individual help. It is however time consuming if used constantly as often the need requires.

As stated earlier the form of individualization chosen will depend upon external conditions of the instruction, the teachers' purpose and philosophy, students' need characteristics, and the method which teachers feel more comfortable in using. While considering these factors, teachers will be able to designate the type of intraclass grouping needed for that content of study. Intraclass grouping refers to any type of group set up within the same classroom. These patterns mentioned previously are approaches used when teachers individualize their curriculum. Whether the form of individualization is completely individualized or not, teachers need to remember that students need to work on their own. Any of these approaches allow students to self-select, self-pace and self-motivate their instruction to some varying degree.

Another type of Grouping Procedure found within a classroom is whole class instruction. This plan is useful when the occasion arises where all the students would benefit from the same instruction or activity. However if used all the time, it can become detrimental to the individual needs of students because when teachers instruct the class at a whole, instruction is geared, in most cases, to the average learner within the class.

Whenever teachers consider implementing individualization practices, the method chosen will depend upon the teachers' expertise in implementation. Consideration will need to be given to the goals and demands of the curriculum. Teachers also need to know the holistic students and this can be accomplished through some form of assessment, be it informal or standardized. "The key concepts to effective grouping are flexibility, diagnosis, preplanning, and teacher objectivity."[1]

Having done the research, questions, such as, why do content area teachers frequently refuse to employ any form of individualization within their content area classes. Certain factors lends some form of explanation. These teachers see a large number of students and these intra class organization patterns require alot of stages, time the teacher may not have. Also the demands of most curriculum, which are full already keep on growing, using up some precise classroom time. Whatever the reason being, content area teachers may feel different towards individualization after considering the following facts.

1. It seems that even the mentally superior secondary and college students are among the most seriously retarded reader.

2. A classroom at the high school level may have students with a reading range of about 6-9 grade levels and at times it may be as great as 12-14 grade levels.

3. Fifteen percent of America's adults are functionally illiterate while fifteen percent of the others, read and write at or below the sixth grade level. It seems that about only fifty percent of America's adults can write and read better than the average 8th grader.

4. Millions of adults will lose their jobs due to automation and will find it next to impossible to prepare themseleves for another job due to their lack of reading skills.

5. A large number of school dropouts leave because they are unable to comprehend what is being taught for they lack specific reading skills.

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[1]Shepherd, David, Comprehensive High School Reading Methods, Columbus, OH: Charles E. Merrill Publishing Co., 1973, Chapter 9.

6. Most of today's college freshmen lack the reading skills necessary to learn at the college level.

All of these facts show that teachers have responsiblilities to students that doesn't seem to fullfill when whole class procedure is used a greater percent of the time.

If the secondary institution recognizes a need for a developmental reading program, each content area class will be effected. In order to have such a program every subject, teacher, and student would be included. The written objectives would need to be clearly defined and based upon the students' needs which would result in direct reading instruction in every content area. An adequate supply of interesting materials at various levels of comprehension would be needed. Content area teachers would possibly need in-service reading instruction but the school also would benefit from the services of a reading specialist. In utilizing such a program, the institution would be recognizing reading as an integral part of the total educative process and the fact that reading needs to be taught at all grade levels. If the institution, teachers are working in, doesn't recognize these needs, teachers should independently implement the best organization patterns needed for that particular time. If this is done, all students will experience a growth in learning which is what the act of educating should accomplish.

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MARCH REPORT

"STRUCTURED OVERVIEWS & STUDY GUIDES"

TITLE IV: PART C
DEVELOPMENTAL GRANT

PHYSICAL SCIENCE

Claire LaBrie

In doing this month's research some interesting concepts concerning why students have a hard time reading science material became apparent. Our high school students are used to reading materials of a narrative nature. When presenting these students with science materials, teachers have little control over the number of concepts introduced on a page of the text book or within a chapter. These reading material require student's to read carefully, not only to understand the concepts, but also to see a relationship between them. Since science concepts develop on an ascending scale of difficulty, students need to use their background of previous knowledge and this can cause problems. Science requires students to sense relationships, and to think critically about what is already known and what is currently being read. Students not possessing critical reading skills have trouble in judging the authenticity and value of the data being read. Therefore, upon seeing all of this, one is safe to Assume that some high school science students have difficulty in reading science materials because of the facts just presented. Other factors that can contribute to these reading inadequacies are students' lack of study skills, their inabilities to learn the technical vocabulary plus being compounded by materials being insufficient in quantity and highly varied in readability level. In summarizing this, there are three types of reading done by science students:

(1) intensive reading of textbooks and laboratory manuals,
(2) assigned collateral reading in scientific journal, and
(3) reading of a non-technical nature.

As teachers, then, our job is to make the reading act as rewarding as possible. The realm of this paper, deal with methods that are employable to accomplish such.

The fact that there are two kinds of learning readiness needs to be emphasized before one looks at how to construct any studying aids. The first kind of learning readiness, broad readiness, refers to that preparation which allows a learner to function adequately within a large learning unit. (Example - a year

of learning in a Physical Science class). Specific readiness refers to the adequacy of the background learners bring to a given class, for example, what learners bring to a class in their background of knowledge when a new concept is introduced that is related to the one previously learned. Once teachers have established what is to be learned, they can then take measures to guarantee that their students have needed to learn the materials. Many different types of aids can be employed to achieve these purposes.

Organizational patterns deserve careful examination when aiding students to prepare for what is to come. External organizational patterns, representing characteristics, such as format and physical features found within a text are worth focusing upon. These include any graphic aids, indices, appendix, chart headings, and divisions and subdivisions shown by bold face print, underlinings or italics. These can provide clues to determine the author's priorities and to identify the nature of the content. Internal organization patterns which refer to the types of writing patterns used by the authors are also helpful in providing students which clues about what is important and what isn't. Both of these organizational patterns can be given specific attention in the fall as students are examining their text, realizing of course, that reinforcement would be needed especially with internal organization patterns as the year goes by.

Teachers have two specific tasks when guiding students on how to use organizational patterns or any other types of patterns. They have to discuss this pattern as part of the structure of their total lesson so students are aware of the process they are to apply. Also, they need to provide a guidance, especially so, with unfamiliar organization patterns. This can be accomplished with the use of guides since guides are simulators used to ensure that students develop a feeling for the different types of clues authors use. When using guides, consideration is given that not all students can read the text, rather, it is assumed that students have different readability levels where guidance is given so all can experience success at the level that their present competence will allow.

Whenever students experience success with a guide, it builds their confidence and their degree of independence. The idea of any form of guides is to provide guidance as long as it is necessary for students to gain sufficient confidence and skills to function independently. Needlessly to say, guides need to be constructed with the learners' comprehension level in mind. Any transfer of previously learned patterns should be encouraged and reinforced as the learner experiences success with the present level of comprehension.

To become interested in content, students must become interested physically, emotionally, as well as intellectually. The use of study guides are limited in the areas of physical and emotional involvement, however content guides, process guides and structured overviews can be useful in the area of intellectual involvement. A content guide consists of an outline of content, different vocabularies and study questions to assist the learners in understanding the content. This guide attempts to focus the students' attention to certain part of what they read. It helps them with the specifics that you want them to acquire from their reading. A process guide usually takes the form of teacher prepared explanatory notes and student directed questions to guide the learners as they read. It provides them with help as they are reading by stressing certain points or vocabulary words. A structured overview is a teacher-made device which can be very helpful in helping students see a clearer picture about what they will be learning in relationship to what they have learned. The structured overviews has two critical features:

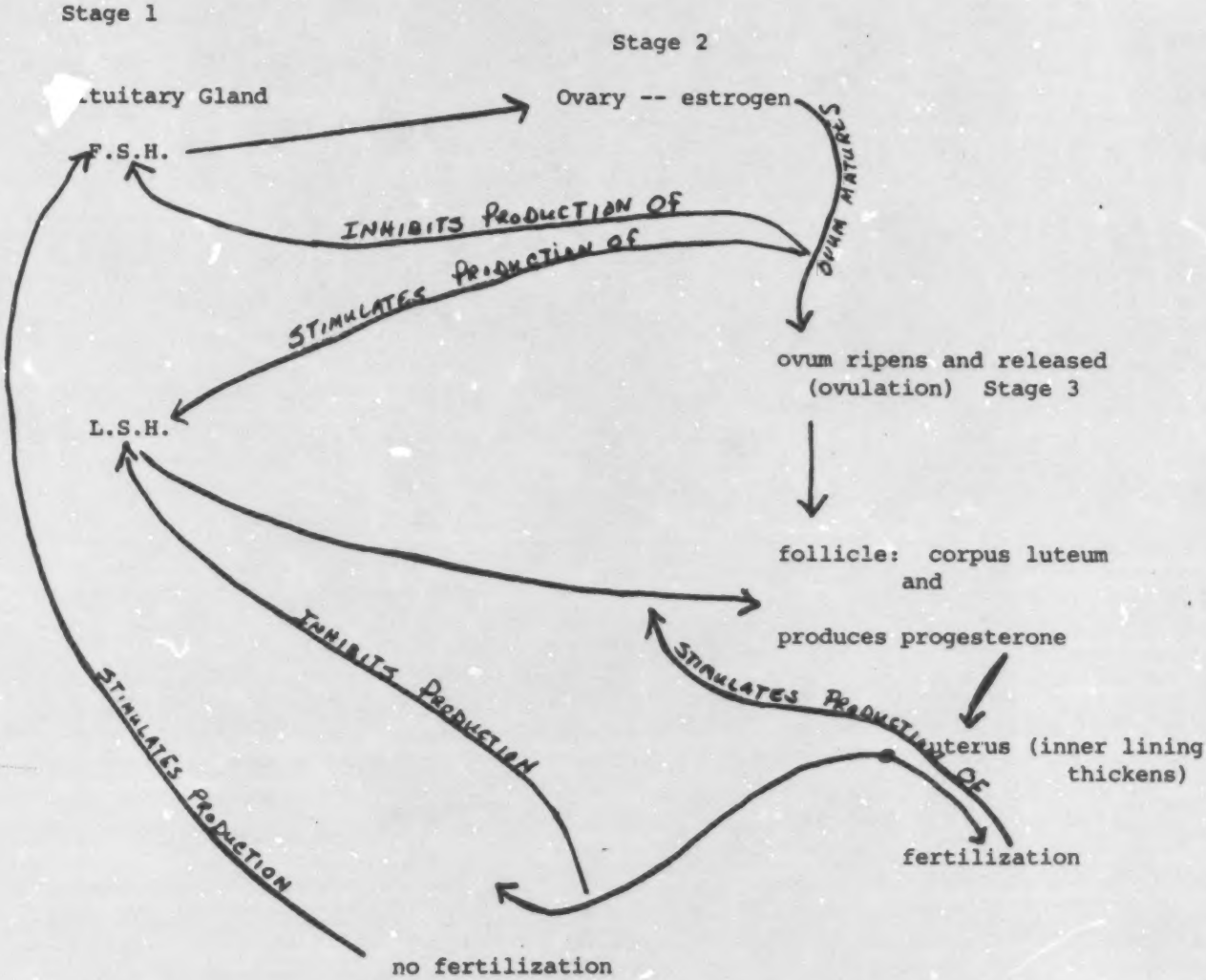
(1) the technical vocabulary is arranged to show relationships among the terms and relationships of the vocabulary to the structure of the discipline.

(2) it allows interaction between the teacher and students through which changes can be made based on the learners' cognitive structure which are revealed as they converse.

There are steps that can be followed in constructing any of these guides. In constructing and using structured overviews, first, analyze the vocabulary of the reading - learning task and list the words you feel are important for students to understand. Second, arrange the words until a form of diagram is produced which shows the interrelationships between the concepts particular to the learning task. Next, one can add to the diagram, vocabulary concepts which are believed already understood by the students so that relationships can be depicted between the reading task and the content as a whole. The forth step involves introducing this overview to the students. The diagram is displayed and one explains why the terms were arranged as such. Finally, as the new content is being learned, relate any new information which seems appropriate to the structured overview. During the construction of a concept guide two steps are important. It is recommended that the reading passage be analyze, determining which concepts the students need to acquire, listing each concept in a word or short phrase. The passage is then reanalyzed and statements are selected which are the basis for the concepts. These statements will then form the first part of the guide. In the second part, the reader, once directions have been given that he should examine the ideas listed in Part I should categorize the ideas with the use of numbers with respect to conceptual heading. The process guide is different from the previous mentioned because this guide can be inserted next to the reading passage and its aim is to provide clues that aid readers improve their comprehension. This type of guide deals more with the internal organizational pattern used by the author and it reinforces some of the readers' reading skills. Guides can then be seen as an essential piece when introducing new concepts. Like any new assignments, study guides, should have essential characteristics if they are to stress the development of original thinking and a more careful directed learning. The structured overview that I have devised is to be used during a Health class dealing with the monthly mentrual cycle of a female. The study guide is geared in

such a way to aid the students in their note taking skills also. The materials used for this particular unit comes from a multiple of resources, therefore, the students get their information from a lecture type environment.

STRUCTURED OVERVIEW: A female mentrual cycle



STUDY GUIDE: for lesson using the structured overview during with the mentrual cycle.

The following represents a prepared sheet which would be given to each student to be filled out as we progress through the material.

Directions: Fill in the blanks with phrases or sentences as I am teaching this material so that you can use this to study from.

Mentrual Cycle: Average span 28 days.

Begins: appearance of menses

Ends: offset of next menses

Stage 1: Menstrual stage

Pituitary Gland: Follicle Stimulating hormone

travels to: ovary

travels by: blood stream

function: stimulates the development of ovum in a follicle

OVARY: estrogen hormone

Stage 2:

Follicle Stage

function: works to ripen and release an ovum

inhibits production of: F.S.H.

stimulates " " : L.S.H.

Stage 3: Ovulation

Ovum released

↓

follicle changes → corpus luteum

↳ produces

↓

progesterone (hormone)

function:

causes the inner uterus to become a soft and thicker lining.

Stage 4: Corpus Luteum

DECISION

no fertilization

fertilization

Pituitary Gland

a. inhibits production of F.S.H.

b. stimulates production of L.S.H.

corpus luteum — stage 4: ends

stage 1: begins

↓

Mentruation:

↓

Stage 1: Menstruation

uterus lining is shed

Pituitary Gland produces F.S.H.

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BEST COPY

Project CAPABLE

CLASSROOM ACTION PROGRAM

AIM: BASIC LEARNING EFFICIENCY

"to make each student a more capable learner"

CO-DIRECTORS

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Science

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Math

APRIL - MAY REPORT

INTEREST, MOTIVATION, ASSESSMENT

TITLE IV: PART C
DEVELOPMENTAL GRANT

PHYSICAL SCIENCE

Claire LaBrie

A program, like Project Capable, needs to undergo evaluation if its objectives are to be met. Whenever a combination of content, personnel, activities and resources are organized so as to attain specific goals and objectives, that program needs to be evaluated. Program evaluation serves different purposes, four of which are, communicating with public, providing information to decision makers, improving existing programs and generating a sense of unity and growth.

It is important to communicate any comprehensive information available about the program to the public. Lack of information can lead to inadequate judgement, therefore a full range of the program's objectives need to be given to the general public hwich consists of parents, teachers, students, business community, industrial, professional and retirement community. The evaluation information will also increase the quality of any decisions made concerning the program and can also serve as a diagnostic tool by providing feedback about what is happening. It has been shown over and over again that assessments of common objectives usually generate unity and growth because it offers maximum benefits to teachers and students and imposes minimal burdens on them.

Whenever a program is set up, it is important that the objectives be stated in clear, and observable terms. It is also necessary that the type of training or instruction to be given be stated. This can be accomplished by spelling out the procedures and techniques by which it is expected to reach those objectives, and lastly, it is as important to have a build in evaluation monitoring device. Written below is a checklist of steps which can be used in determining evaluation purposes and requirements:

I. Define evaluation purposes

II. Review needs assessment, program goals, and program objectives.

III. Review program activities

IV. Identify evaluation requirements

V. Identify evaluation resources and constraints

A note to keep in mind is that if evaluation is to be useful, it is important to add any new questions as they arise.

The purpose of Project Capable is defined as such:

By the end of the school year, students involved in classrooms where an experiential approach for the Project is employed, would show an increase proficiency in the use of basic learning skills which would have an end result of an increased in amount of content learned and retained as measured by pre and post tests.

The second step in an evaluation program involves finding information which is needed to answer the questions written during the 1st step. This stage can be divided into the following phases:

I. Preliminary work

A. Assessment of needs and setting of program's goals and objectives. Since evaluation of a program is based on what the program is trying to accomplish, objectives need to be sufficiently explicit so whatever process which have been made towards the goals can be assessed.

B. Program Activities

C. Evaluation Questions; assumes task of gathering information which will help answer questions and in turn help improve decisions.

D. Assessment of Instruments

1. Norm - reference tools
2. Criterian - reference tools
3. Questionnaires
4. Interview guides
5. Structured narrative reports
6. Observation
7. Rating sheets
8. Log sheets
9. Record summary forms

Each tool has its own strengths and weaknesses and should be considered in light of what criteria was developed for specific evaluation.

E. Administration Dates & Personnel - Consideration needs to be given to this because the dates can effect reliability of the data and so may personnel if not qualified to administer test.

F. Data - Analysis techniques: involves organizing the quantity of data so relationships which would not be seen can be.

G. Monitoring Dates & Personnel.

I. Key Reporting Dates.

J. Who is to receive reports: needs to be decided before hand.

K. Determining how data reports will be used.

II. Review of Preliminary Plans with the following:

A. Program staff

B. School Principal

C. District Administrator

D. Representative from funding agency, etc.

III. Evaluation Timeline: showing all actions with the amount of estimated time listed and the actual dates of implementation also listed.

IV. Determining and Obtaining Required Resources.

V. Checklists for evaluation planning: provides one with a list of major steps required in developing an evaluation program.

During the third stage of an evaluation plan, decisions concerning the location of necessary information is examined. Sources of information can be people, students, agencies, a records possessing valuable data needed to answer questions. After the information needed is located, a move to the next stage follows. This stage involves deciding upon which instruments is to be used to find the answers to the questions brought out during Stage 1. Instruments are the tools or means used to collect information. There are two major types of instruments:

I. Standardized tests

A. Norm - referenced

B. Criterian - referenced

II. Informal tests: will be discussed in greater details later.

It is wise to consider a variety of potential evaluation instruments and then to analyze every possible alternative so as to select the instruments which can

do the better assessment. Factors that need to be considered in determining which tool to use are:

1. Costs

    a. cost of purchasing
    b. cost of scoring and analyzing of data.
    c. amount of time involved of students, staff or community resource persons.

2. Timing

    a. deadline when the information is needed
    b. length of time to plan, collect, and analyze data
    c. the most appropriate time for collecting data

3. Credibility of findings

    a. validity

4. Degree of obtrusiveness

5. Coordination

    a. amount and type of interference that may affect students, staff and other people in program.
    b. people or agencies to be involved in the data collection for each instrument.

6. Efficiency

    a. reliability of instruments

It is important to match instruments to program objectives, therefore, this stage needs to be taken slowly and seriously. The decision concerning which assessment instruments to be employed depends also on what is being measured, such as achievement, performance, attitudes or how students interacts among others. Once it is determined, the next question can be more specific; what kinds of instruments will be used? In planning for data analysis, attention needs to be given to the types of items used on the tests and the kinds of scores various tests employed.

<u>Kinds of items</u>:

1. open-ended

2. Objective

a. True/False (Yes/no)
b. Multiple choice
c. Master list
d. Ratings
e. Matching
f. Checklists

3. Mixed (open-ended and objective)

Kinds of Scores

1. Raw Scores: number of right answers obtained by a student.

2. Grade equivalents: a score derived from a raw score that expresses grade level as an average.

3. Percentile: Score below which a given percent of the cases lie.

4. Standard score: a scaled score based on the mean and standard deviation which define the distribution of scores.

5. Stanine: a scaled score with a mean of 5 and a standard deviation of 2.

All of this information can be gotten either by reviewing individual tests or checking Buros' Mental Measurements Yearbook which gives fairly comprehensive coverage over a wide range of instrument types.

The act of assessment is a necessary tool in any evaluation program. Whenever assessment of students comes into view, time needs to be taken so that a preview of students' motivational technique can be studied. Motivation, or need, can be defined as a property which causes students to do something that results in satisfaction. There are basically two types of motivation found in students. The intrinsically motivated students are motivated from within. They have a high need to succeed academically. The extrinsically motivated students have a low level or a nonexistent academic need. These students need to be motivated by someone else.

There are factors found which influences which type of motivation students possess. These factors can be broken down into two categories: Affective factors and cognitive factors. The affective factors are as follows:

1. Interest: referring to a curiosity or a concern about something.

In a subject area, interest doesn't bloom overnight; but rather it is developed after many exposures to those areas that strike their curiosity.

2. Attitude: a deposition or mental set toward something, which might be in a subject area and/or a teacher. These can be either positive or negative and are initially created by parents and later refined by teachers.

The second category, cognitive factors. have these following aspects:

1. Purpose: Reason for doing work is an important aspect which is needed in order for students to be motivated.

2. Short-term goals: Provides an incentive to do something because accomplishment is seen in a short amount of time.

3. Adjustment for reading levels: Provide students with materials within their reading range.

4. Knowledge of results: Knowing if one possesses the skill or not and what one does wrong is necessary if students are to continue with the work.

5. Success: This will help in providing future motivation.

6. Usefulness of knowledge: If knowledge is needed, easier to learn and easier to retain.

These factors do help or hinder motivating content area students but teachers need to be aware that some of these factors may encourage indadequate motivation due to reading difficulties.

Certain factors which may cause reading difficulties are the P.L:E.A.S.E. factors explained below:

Physical factors: vision, hearing, and health
Language factors: grammar, vocabulary...
Environment: home attitude towards education
Apptitude: visual and auditory memory.
Social and emotional: relationship with peers, family and self.
Education: quality of teaching, appropriatness of materials and classroom size.

Finding the appropriate level of materials for students is a must. Materials and texts selected to be read by students ideally should be at their instructional level whereas supplementary materials be written at their independent level. In order that this can be accomplished, teachers need to know the cognitive reading achievement of their students which can be measured by using

standardized and/or informal testing instruments.

Standardized Reading tests allows teachers to compare their students' reading achievement with national norm. It provides an easy way to grossly rank students within one class from strongest to weakest. These tests can either be in an oral form or silent form. An oral reading test allows teachers to find out how well students read orally as compared to nation; whereas, a silent reading test determines how well they read silently as compared with nation. Certain precautions are worth noting however, such as, these tests are usually survey tests which only yield a grade or percentile score and do not usually give reliable information since the scores usually reflect the students' frustrational level. A standardized reading-listening test can be used to determine the students' listening capacity as well as their readability level. This hearing capacity reflects students' reading expectancy level which can be very useful to know.

Informal testing technique provides teachers with different aspects that standardized testing instruments can not. With proper use, these instruments can provide each student's frustrational, instructional and independent level of comprehension. They can also be used to determine if the selected text book is too hard by using a cloze readability technique. There are many types of informal procedures. Some of them are as follows:

1. Observation: these need to be made with an objective in mind and a record needs to be kept.

2. Work samples: can be useful in supplying information concerning lack of certain learning skills.

3. Students Reactions: finding out how students feel by using -

    a. questionnaire technique: open-ended question which can be helpful in diagnosing attitudes.
    b. interest inventory: finding out which particular area of your content they enjoy.
    c. Ring-a-Bell technique
    d. Letter of Alphabet
    e. Reading Autobiography: a written account of students' reading experiences.

f. Daily Schedule or Daily Record: of time spent studying and/or reading.

g. Projection: students are presented with a stimulus and are allowed time to respond freely.

h. Oral response

1. Interviews
2. Retrospection

This list of informal inventories is very useful in determing students' attitudes toward learning. If one would like to assess their students' level of comprehension, the use of informal reading inventories are available. Teachers may also use an informal study skill inventory to assess the study skills of their students.

It is also important to know why students choose to read. Some students read for these reasons below:

1. Instrumental effect - helps students achieve their goal more efficiently.
2. Prestige effect - helps improve own self-image.
3. Reinforcement of attitude - choosing materials from both sides helps reinforce one's views.
4. Vicarious aesthetic experiences - helps students understand it better through the words of someone else.
5. Respite - to relief pain or sorrow, students read to escape.

The follcwing is a list of facotrs that determine what students will read and how well he will read:

1. availability and difficulty of materials.
2. style in which material is written.
3. what they have read previously.
4. how much they depend on others to solve their problems of reading choice.
5. feeling of hope, fear, a satisfaction they experience when reading certain styles of writting.
6. what they have done before when confronted with the choice of reading versus non-reading.
7. their self-concept as a reader.

Teachers can disvover what students enjoy reading by using informal procedures. They also can develop students interest by making interesting materials available and encouraging students to read by allowing classroom time for such.

Remembering that teachers enthusiasm is contagious is an important key in developing students interest and providing them with motivation to undertake any task.

The fifth stage of an evaluation plan is the design. During this phase, who will complete the instruments and what comparisons will be made, is decided. An evaluation design is a plan or strategy for collecting and analyzing information about the program. It also identifies the comparisons or criteria to be used in judging the program's success. Example of a design is the use of pre and post-test which are administered to students and the results are compared. When selecting a design - a primary question needs to answered: how much more did pupils learn by participating in the program than they would have learned without it? in order to answer this, two pieces of information are needed; (1) how much students have improved between time program began and ended - answers to this question can be gotten from experimental group which were given pre and post-tests. (2) An estimate of how they would have done without they program. This can be received by using a control group who are also subjected to pre and post-testings but do not receive the same program.

The design selected should provide valid data for decision making and sound justification for continued funding. It needs to deal with the following questions:

1. At what levels are students functioning at the beginning and end of the program? (use of pre-test and post-test)
2. How much growth occurred and how does this growth compare to our expectations? (use of reference groups)
3. What elements of the program contributed to the gain or loss? (need to keep records, use same or comparable assessment instruments, and need to keep program long enough to get reliable data.)

It becomes clear that a good evaluation design produces valuable information. The cost of translating a design is high therefore mistakes must be kept to a minimum. Any variables which may affect the design needs to be discussed among team members, and careful consideration needs to be given so that the

data is as valid and reliable as humanly possible.

Validity is a matter of degree. One cannot typically judge the validity of the data simply by looking at it. The data can be valid even though a certain trait was not measured directly, therefore, validity can be defined as the extent to which a test measures what it is supposed to. There are several approaches one can determine the validity of data and three of these are:

1. Criterion - related validity: also called emperial validation, is the process of comparing peoples' test-score ranking with one based on actual performance on a criterion task. When this approach is used, test constructors are not overly concerned with what answers are "correct." Instead, they select test questions on which high criterion scores will chose a different answer than low criterion scores. If comparison of test rankings with immediate criterion performance is done, it is often referred to as concurrent validity whereas, predictive validity is the comparison of test rankings with future criterion performance.

2. Content validity: the degree to which a test is a respresentative sample of a body of subject-matter as defined by the instructional objectives used in teaching the subject. Significant objectives of instruction receive the greatest attention on the test, whereas less significant outcomes appear less conspiciously on the test.

3. Construct validity: certain basic traits, constructs, allows us to make predictions about what will happen when the various conditions that influence the construct are manipulated. The important kinds of evidence for construct validity are as follows:

    1. If the test is a valid measure of the construct, person who rank high on the construct will score very differently from persons who rank low.

    2. If a test has validity for measuring the construct, conditions that our theory says will alter the construct should also affect how people score on the test.

    3. If a test is a valid assessment of a construct, it will correlate well with other assessments of that construct, but it will correlate less well with measures of other constructs.

    4. Additional evidence of construct validity will show that it has internal consistency.

A final word about validity needs to be said: a test by itself is neither valid nor invalid. It always has validity in reference to (a) some specific condition one is trying to observe, and (b) a defined group of people on which the test has been tried out.

During the seventh stage of an evaluation program time is set into a schedule within which the program will follow. Project Capable, for example, has scheduled August, 1980, for a pre-testing date and June, 1981, for a post-testing date. On a broader scale, a 3 year period was broken into 3 phases: Phase 1 - deals with researching literature for data. Phase 2 - deals with writing up activities and programs dealing with the data collected and Phase 3 is to be the implementation stage of the program; putting the program into effect.

After this phase is completed, the question of what does one do with the data needs to be considered. Data analysis - Stage 8; is the process of making useful the information received from the raw data. There is a large array of statistics that can be used to interpret the data. Descriptive statistics are numbers that describe a set of data and includes the following:

measures of central tendency; mean, medium, and mode
measures of variability; range, standard deviation and variance
distributions that are other than normal; skewed, bimodal, and rectangular

Inferential statistics are numbers that enable one to test hypothesis and make inferences about the effectiveness of a program. This provides a way to test the significance of the results obtained when data are collected. It is important to note that all measures are subjected to error and to random fluctuations. This kind of statistics provdie a way to separate chance error and random fluctuations from real changes. There are basically 3 kinds of data that falls in this category.

1. Score data: each person has a numerical score that represents his or her performance or behavior.
2. Ordered data: each is placed in order from the most preferred to the least preferred.
3. Category Data: each is counted as being in a particular classification or category.

Once the data has all been analyzed the last stage of an evaluation program is reached. This stage has to do with reporting the data. People who need to know about the effectiveness of the program are as follows:

1. Instructional staff
2. Administrative staff
3. Parents
4. Students
5. Superintendent
6. Communities
7. Funding agencies

The reporting of program evaluation is largely a matter of school-community relations. Whenever the reporting is done, it is necessary that its has these three critical characteristics; relevance, clarity and specificity. It should also mention the program's objectives and whether or not the objectives have been met as indicated by the collected data. The success of any evaluation program depends not only upon the design used but on how well the information can be communicated.

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***All members used same resources.**